

SoS/Interoperability IPT

Integrating Lockheed Martin Strengths

...Realizing Military Value

Capability Integration

Framework for Developing C4ISTAR Solutions

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21 September 2001*

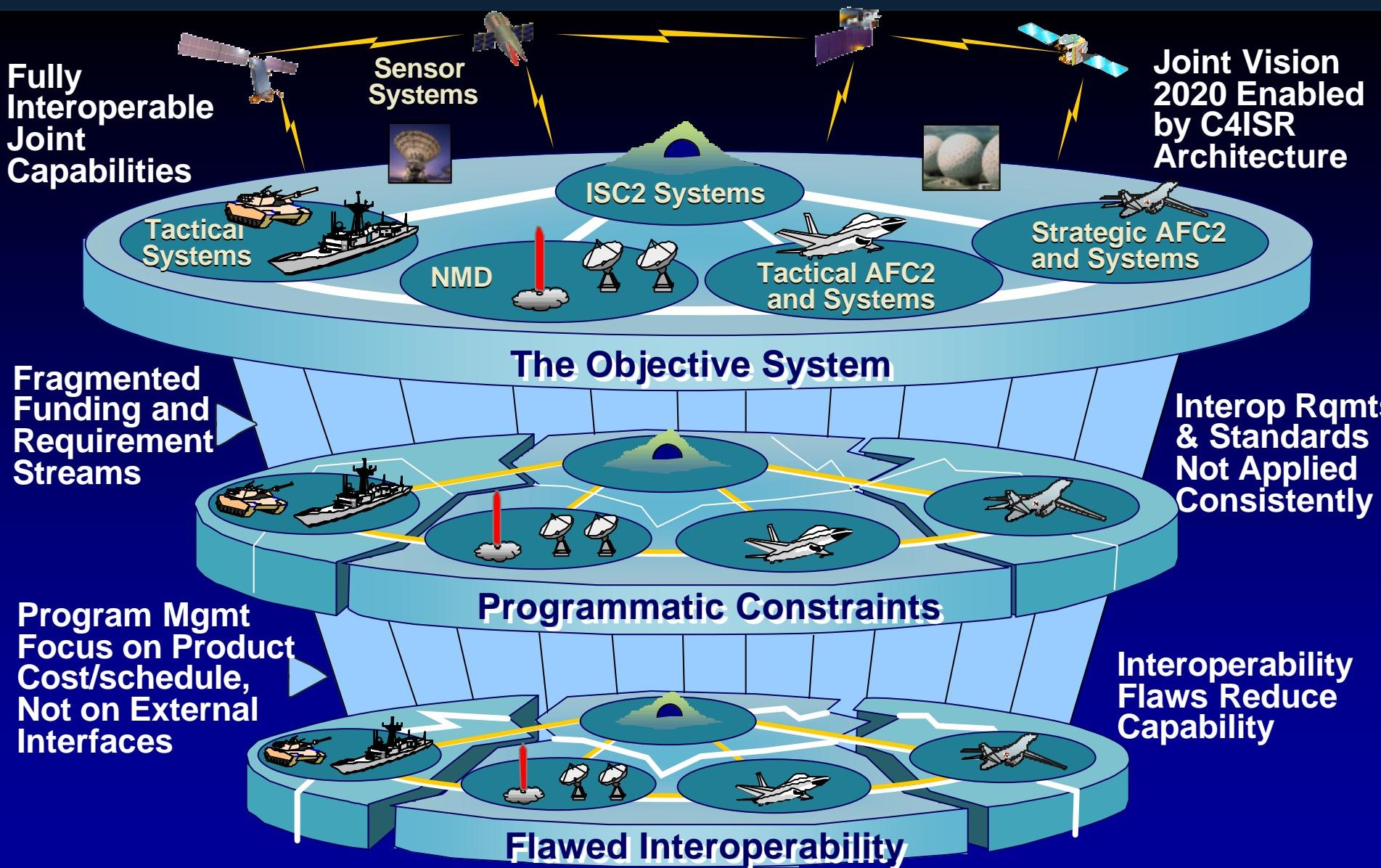
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Main Points....



- **Information-Enabled Warfighting: Powerful, Inevitable, & Fragmented**
- **Conventional Approaches to Interoperability Not Adequate to Produce Integrated Military Capability**
- **Capability Integration is an Emerging Technical and Managerial Competency**

The World We Live In— The Challenge of Joint C4I Interoperability



Mechanisms for Overcoming Flawed Interoperability Are Flawed



Objective	Mechanism	When Applied	Effectiveness
An Effective, Integrated Military Capability		Requirements Development	Still in Early Stages; Many Issues;
Procurement	Messaging & Infrastructure Interoperability Through Standards	Procurement	Troubled by multiplicity of standards
Force Components			
Operations	Interoperability Work-Arounds, Sustained by Training, Tactics & Procedures	OT&E; Joint Exercises; Field Operations	Expensive to conduct; costly to fix

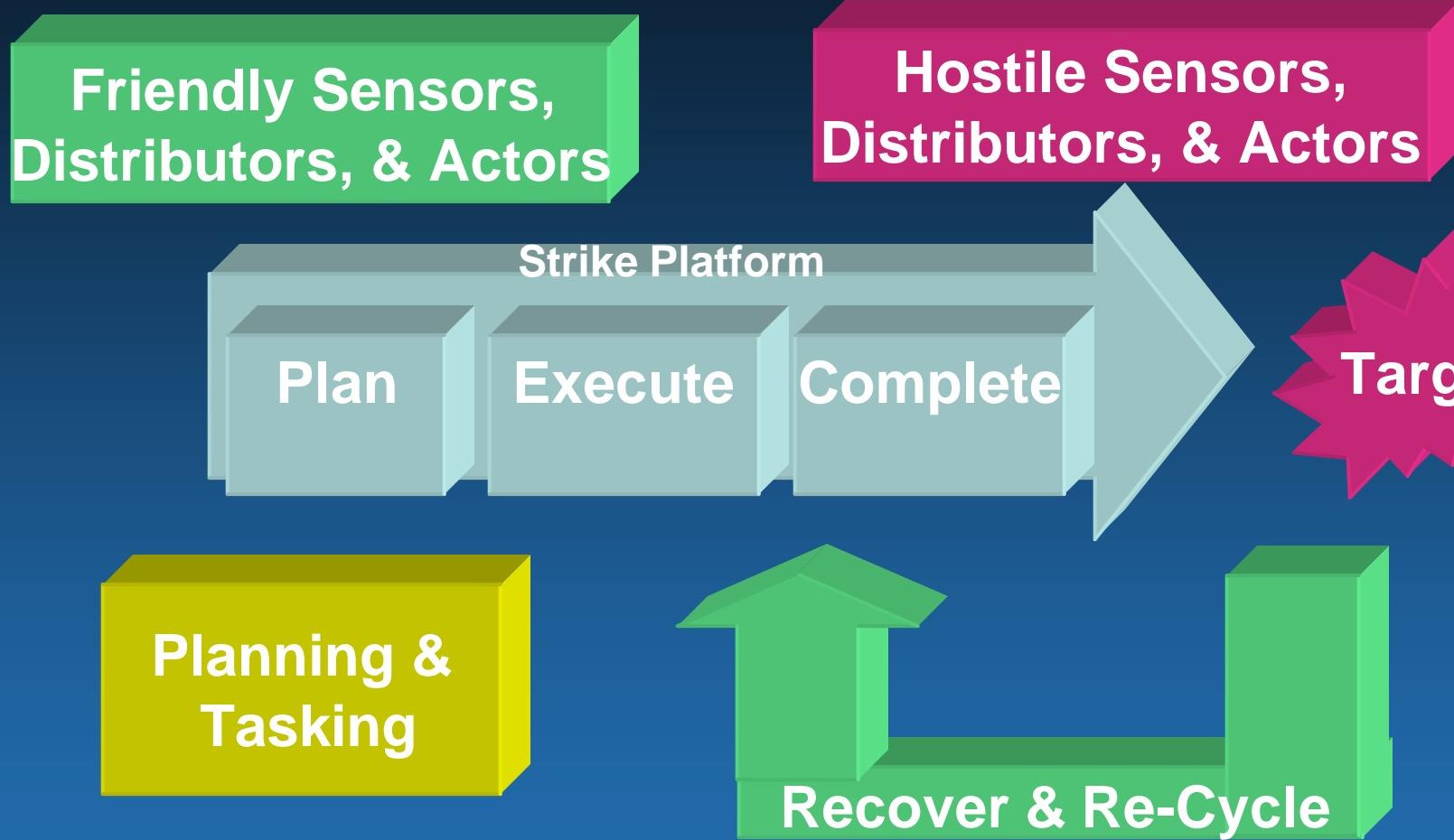
Capabilities Today Are Integrated in the Field



***Effective Attack Against
Time-Critical Targets...***

Capability Example

Effective Attack Against Time-Critical Targets Demands Integrated Operations



*Fragmentation & Process Bottlenecks
in Planning & Tasking Limit Performance*

Time-Critical Targeting Constellation is Assembled in the Field



Find	U-2	Nat'l	Rivet Joint	UAV	JSTARS
Fix	F-16CJ	UAV	JSTARS	JSF	Rivet Joint
Track	F-16CJ	UAV	JSTARS	Rivet Joint	JSF
Target	F-16C	F-16C	F-16C		
Attack	HARM	Maverick	JDAM		
Assess	U-2	UAV	JSTA		

Requires...

- CONOPS Alternatives That Utilize Available Assets
- Performance Estimates for Each CONOPS Thread
- Assets That Interoperate Adequately to Support the CONOPS

Capability Integration Challenges....

- **Moving Capability Integration Upstream**
 - Complicated -- Overlays Capability Portfolio on Product Portfolio
 - Messy – Sorting Through Mixes of New and Legacy Systems, Identifying & Prioritizing Both Product and Process Improvements
- **Understanding & Developing Capability Integration Competency – Enabling Effective Efforts**
 - Architects, Tools, Processes, Technology
 - Adopting A Value Chain Viewpoint
 - Spans Technical & Business Aspects

Benefits: Capability Integration Offers A Systematic Way to Better Extract Value, Improving Performance, Reducing Costs



Moving Capability Integration Upstream

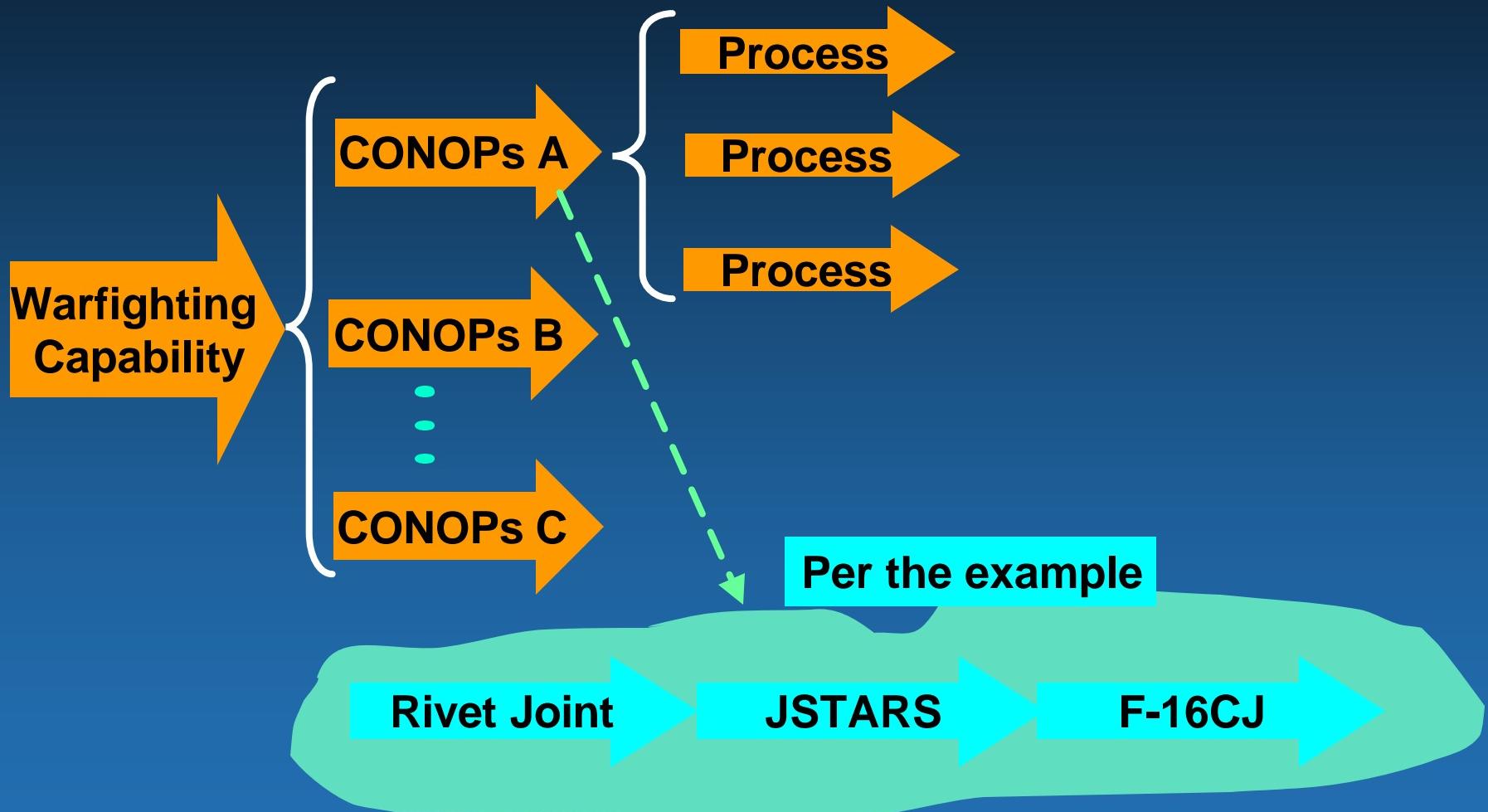
Alignment...



- ***Capability*** for This Presentation Means...
 - Improved Effectiveness of Locating Mines in Surf
 - Effective Attack Against Time Critical Targets
 - ...
- A ***Capability*** is Characterized By...
 - An Operational Architecture...Commander's Intent
 - Process Architecture...Who Does What When
 - An Information Architecture... Supports The Process
 - Conforming Components...The Implementing Agents & Actors
- ***Capability Solutions*** Are Threads Linking Conforming Components Into an Operational Whole

Multiple Solutions Are the Rule

One Capability---Multiple Solutions



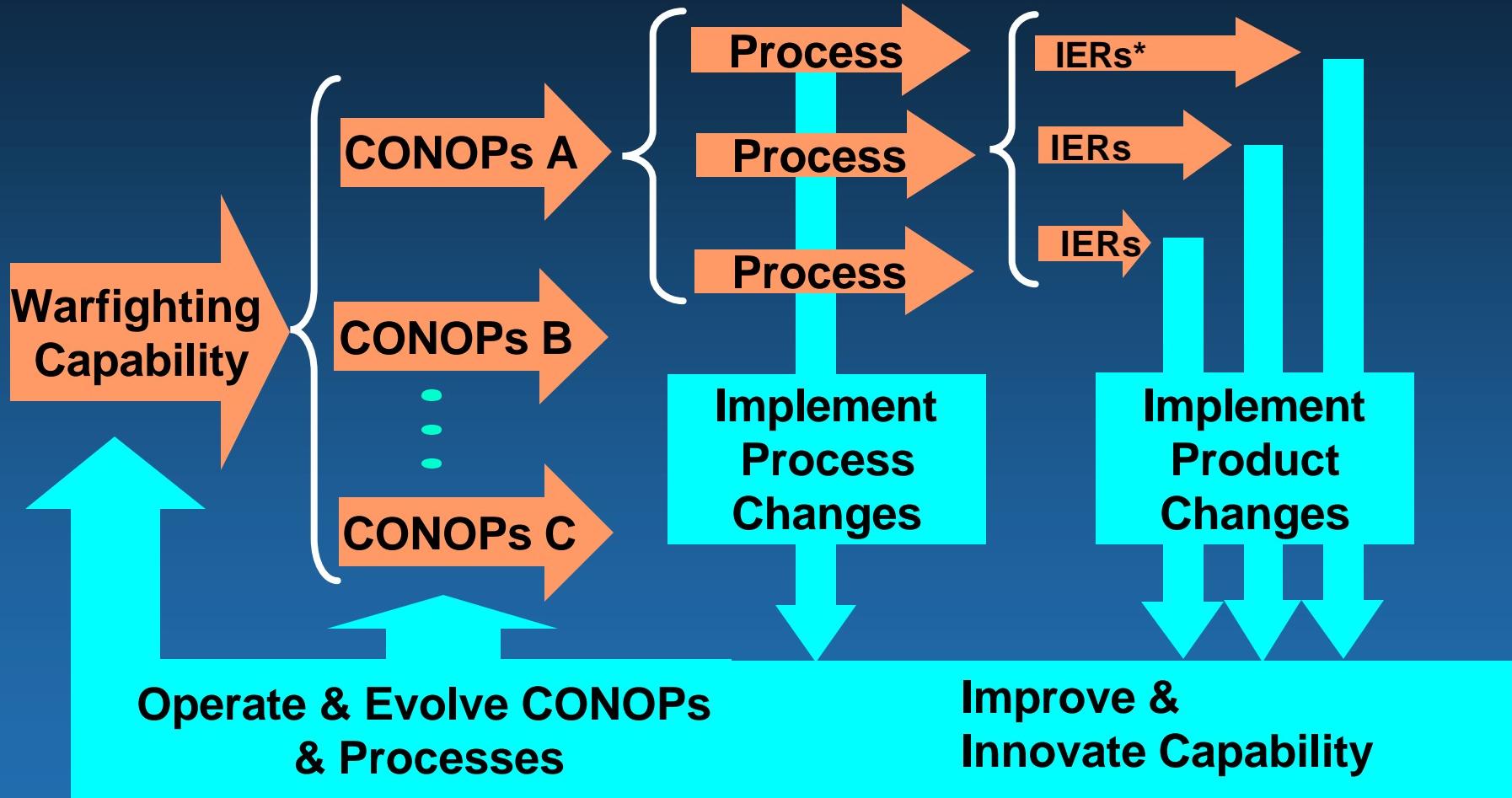
Capability Implemented Through Multiple Threads (Solutions)

Find	U-2	Nat'l	Rivet Joint	UAV	JSTARS
Fix	F-16C	UAV	JSTARS	JSF	Rivet Joint
Track	F-16C	UAV	JSTARS	Rivet Joint	JSF
Target	F-16C	F-16C	F-16C	E-22	JSF
Attack	HARM	Maverick	JDAM	WCMD	JSOW
Assess	U-2	UAV	JSTARS	Rivet Joint	JSF

The diagram illustrates the implementation of various capabilities through multiple threads, represented by colored arrows connecting adjacent cells in a grid. The grid has 6 rows and 6 columns.

- Row 1:** Find (U-2) → Nat'l (UAV) → Rivet Joint (UAV) → UAV (JSTARS) → JSTARS (JSTARS)
- Row 2:** Fix (F-16C) → UAV (UAV) → JSTARS (JSTARS) → JSF (JSF) → Rivet Joint (Rivet Joint)
- Row 3:** Track (F-16C) → UAV (UAV) → JSTARS (JSTARS) → Rivet Joint (Rivet Joint) → JSF (JSF)
- Row 4:** Target (F-16C) → F-16C (F-16C) → F-16C (F-16C) → E-22 (E-22) → JSF (JSF)
- Row 5:** Attack (HARM) → Maverick (Maverick) → JDAM (JDAM) → WCMD (WCMD) → JSOW (JSOW)
- Row 6:** Assess (U-2) → UAV (UAV) → JSTARS (JSTARS) → Rivet Joint (Rivet Joint) → JSF (JSF)

Capability Improvement Opportunities: CONOPs, Processes, Technology



*IERs: Information Exchange Requirements

Capability Integration Needed to Systematically Improve Performance

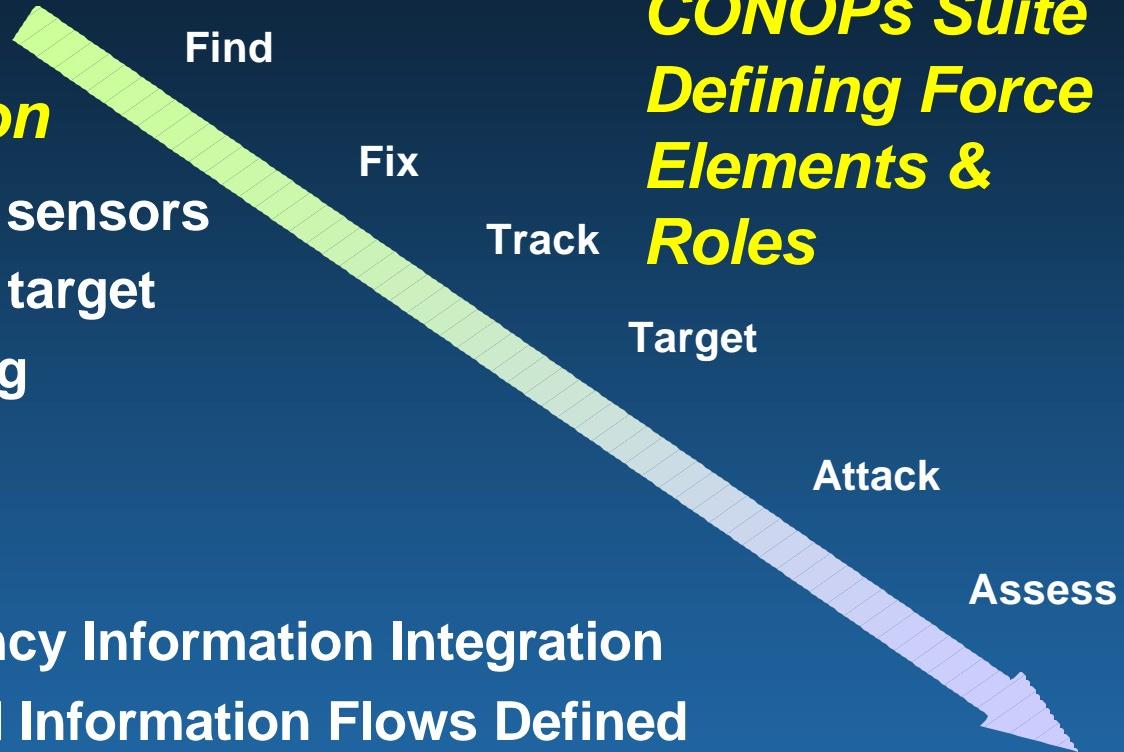


Technology Innovation

- Network Integrated sensors
- Maintain identity of target
- Fire-control tracking
- ...

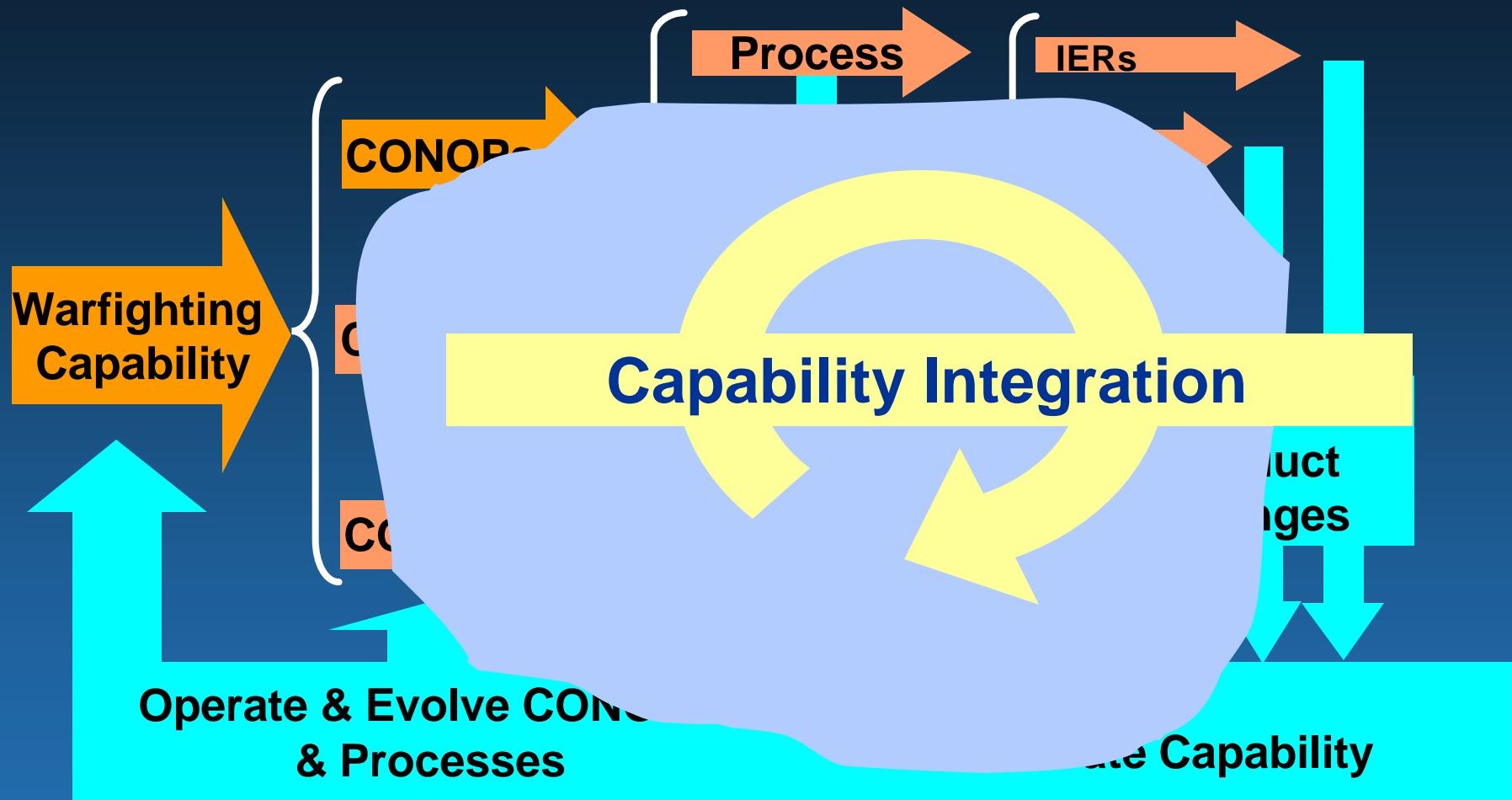
Process Innovation

- Enable Low Latency Information Integration
- Support Required Information Flows Defined
- Support for Rules of Engagement
- ...



Capability Solutions Co-Evolve CONOPS, Processes, Technology, and Interoperable Platforms & Systems

Upstream Capability Integration Matures Capability Solutions to the Field Commander



Improvements Scope Includes Processes, Interoperability of Both Legacy & New Systems, and Technology



Perceptions: Implementing Capabilities

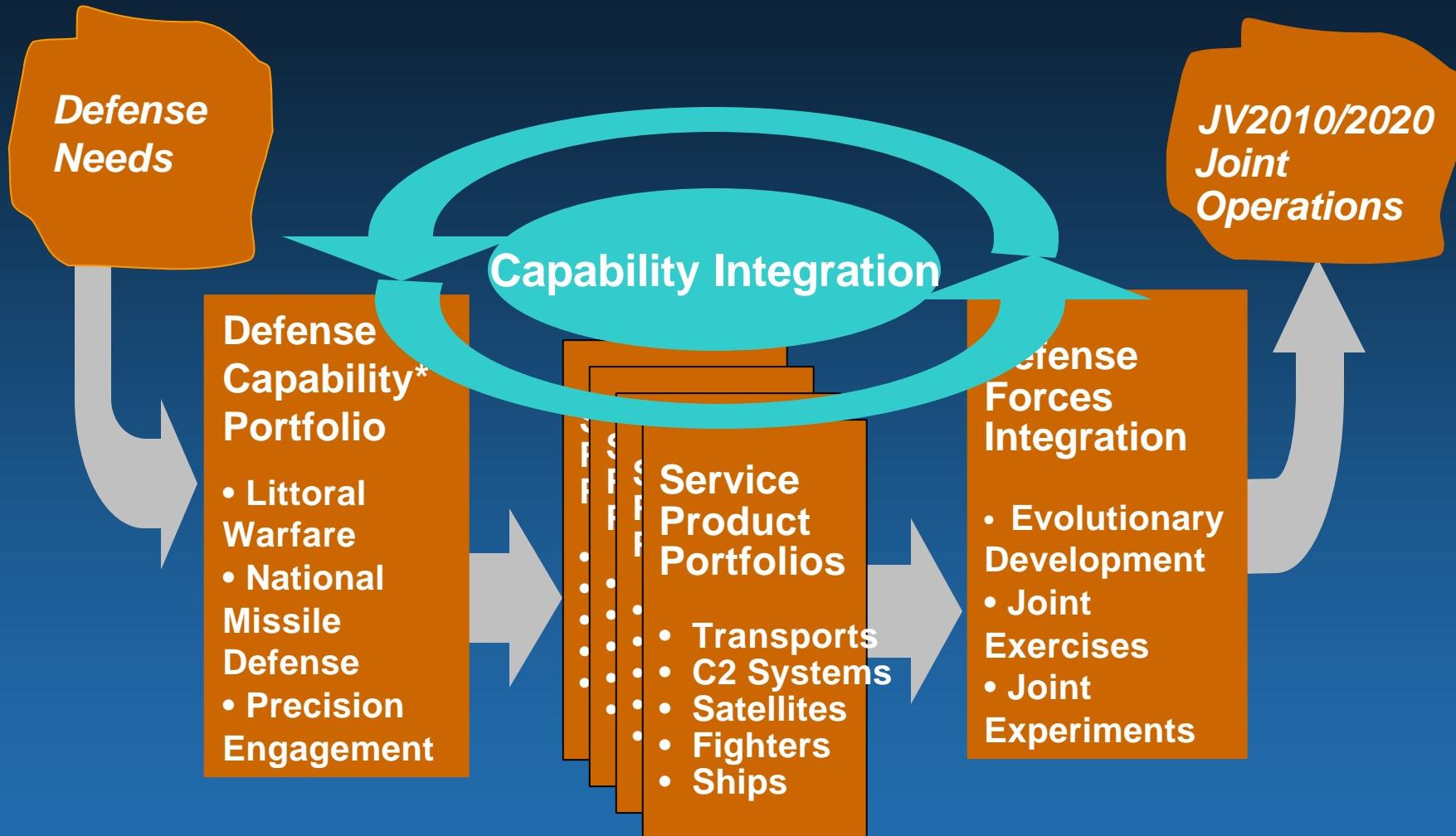
- Strong Movement to Capability-Based Requirements
- Role & Importance of Interoperability Recognized
- Role of Architectures and Interoperability Standards
Not Consistently Recognized
- Many Issues In Information Exchange Requirements Management
- The USG Has No Acquisition Agent Today
(Exception: BMDO) With the Scope to Procure an Integrated Solution
- UK MoD Has Taken Strong Organizational Steps

Emerging Sense — Where is the Capability Integrator?



Capability Integration... An Emerging Discipline

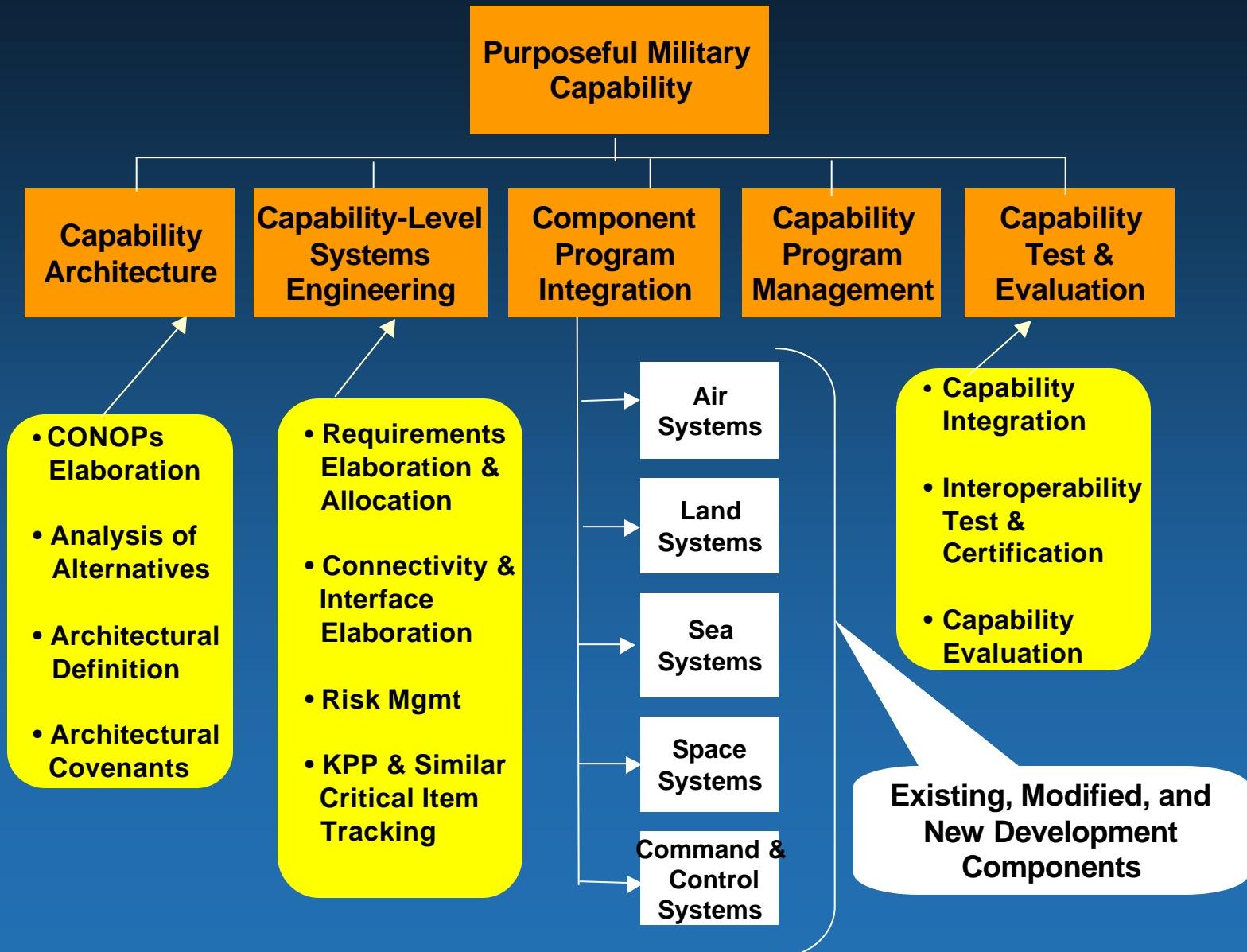
Defense Product Flow... Next-Generation Process



*Notice these capabilities are at an even higher level than we have been addressing; the parsing of capabilities is another challenge.

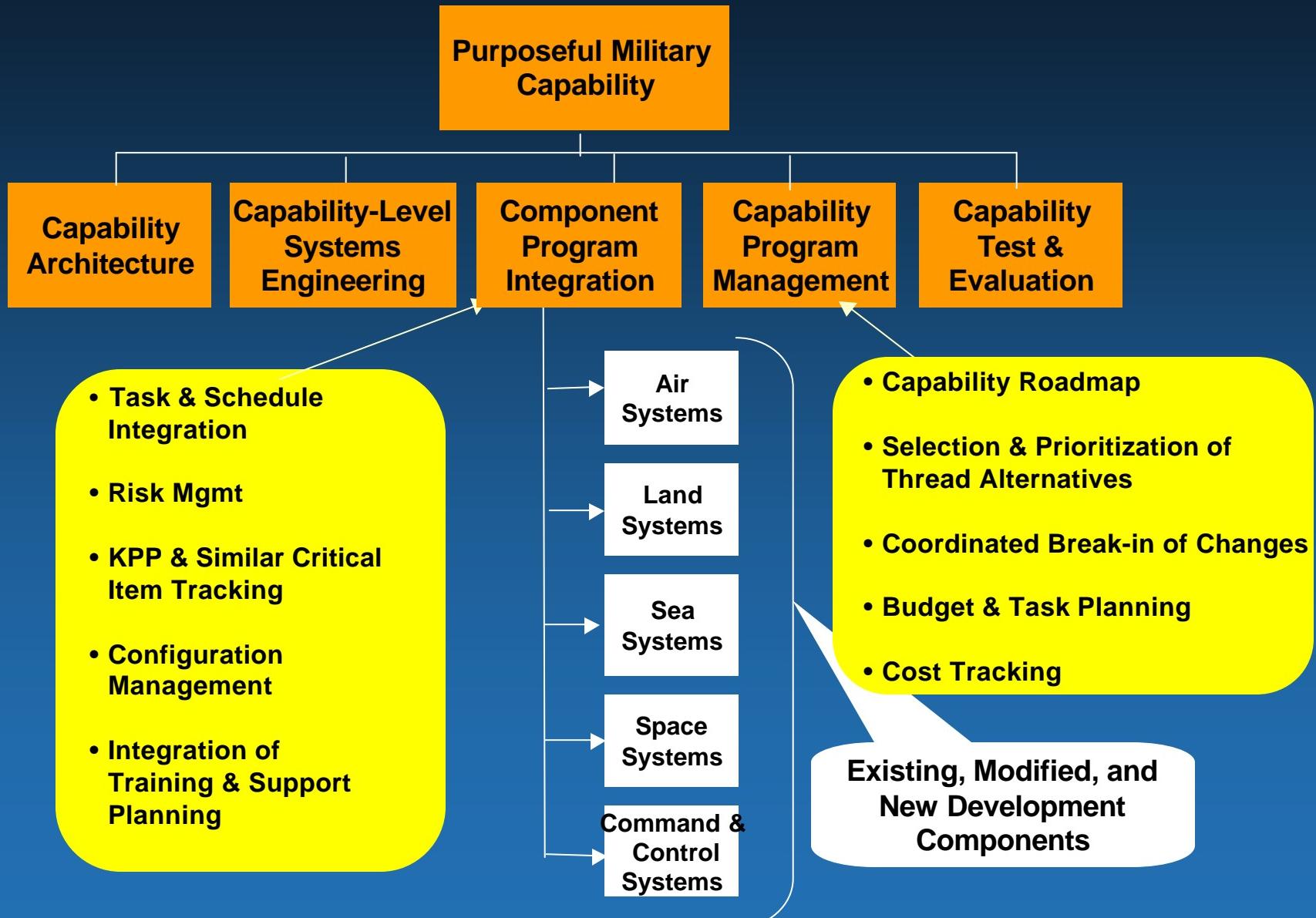
Work Breakdown Structure Template for a Capability Program

1/2



Work Breakdown Structure Template for WBS Template for a Capability Program

2/2





Signs of Progress...

- UK MoD Re-Organizes Around Capability Areas
- Strong Initiative in USN Toward Capability Focus
- USAF Air Material Command Has Instituted An Enterprise Initiative
- JROC Capstone Requirements Documents
- DoD Architecture Framework
- Joint Chiefs Define Joint Mission Areas
- Adoption of Experimentation & Spiral Development

Lockheed Martin Has Companion Initiatives

Our Corporate Initiatives in Capability Integration



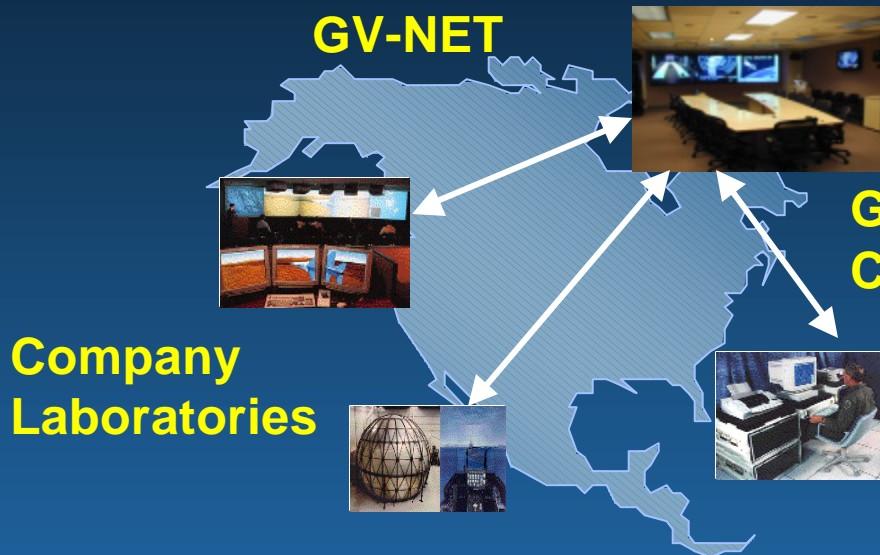
*Purposeful
Interoperability:
Providing a
Defined Capability*

*Messaging
Interoperability*

*Infrastructure
Interoperability*

- **Integrated Mission Architecture Team**
 - Strategic Analysis
 - Architecture Development
 - Tasked by Executive Management
- **SoS/Interoperability IPT**
 - Virtual & physical cross-company forum
 - Share IERs & C4I Plans - CVN-77, DD-21, F-22, JSF
 - Develop battlespace context for programs
 - Sponsor cross-corporate Mobile Target Initiative
- **Project Rainbow**
 - Interoperability Solutions
- **Global Vision Net & Center**
 - Communications Backbone
 - Collaborative Portals

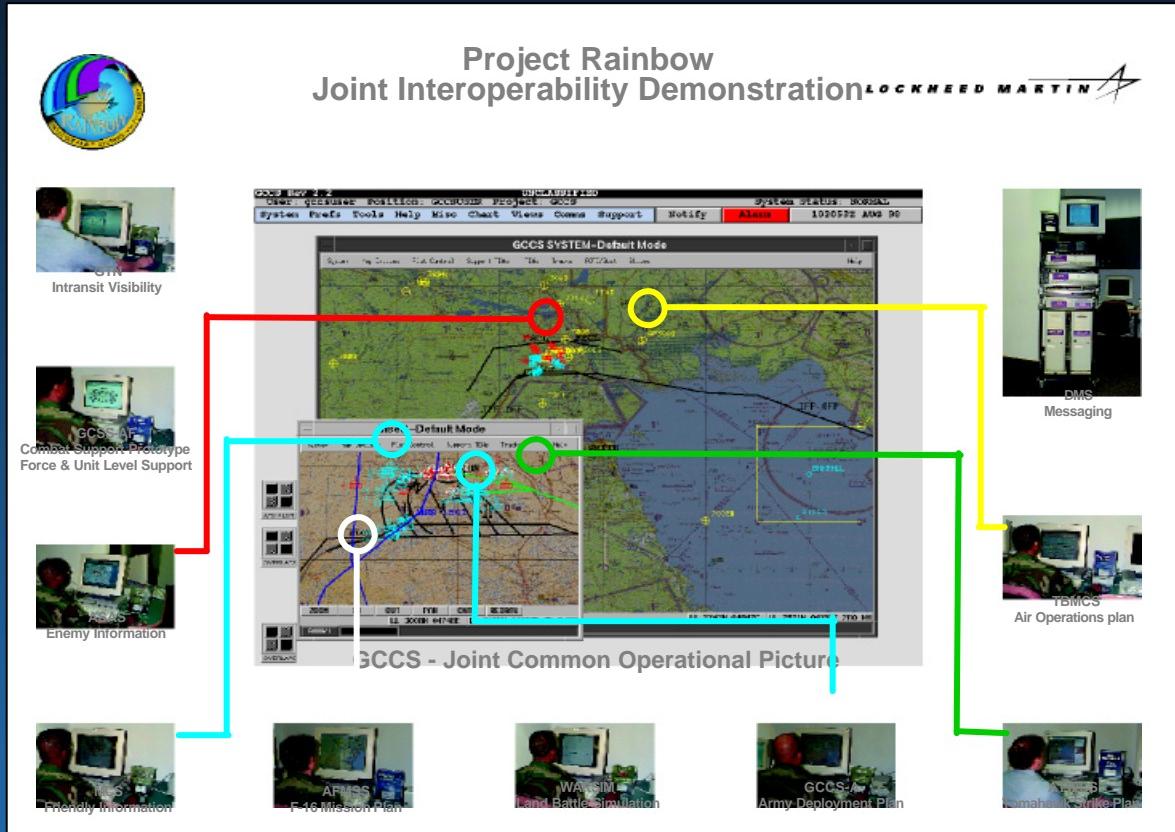
Global Vision Network & Global Vision Center...



- *Experimentation*
- *Design*
- *Development*
- *Demonstration*
- *Test*

A Network-Centric Approach to Distributed Visualization, Collaboration, and Experimentation

Project Rainbow...Interoperability Test Bed and Demonstration Laboratory



- **11 operational and prototype systems**
 - C4I, Combat Support, Simulation
 - Joint, Air Force, Army, and Navy
- **Environment for prototyping, evaluation, demonstration**
 - Technology and operations integration

Main Points....Recap



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